KIIT DEEMED TO BE UNIVERSITY

OBJECT ORIENTED PROGRAMMING LAB

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LAB 1

i. WAP to input name, roll number and marks in 5 subjects for a student, and display it.

ii. WAP to input name, roll number and marks in 5 subjects for n number of students. Write

functions to:-

a. Find total marks and percentage of all n students.

b. Display details of a student with a given roll number.

c. Display the details for all the students having percentage in a given range.

d. Sort the array in ascending order of marks.

iii. WAP to enter id, name, age and basic salary of n number of employees. Calculate the

gross salary of all the employees and display it along with all other details in a tabular

form, using pointer to structure.

[Gross salary= Basic salary + DA + HRA,

DA = 80% of Basic salary

HRA=10% of Basic salary]

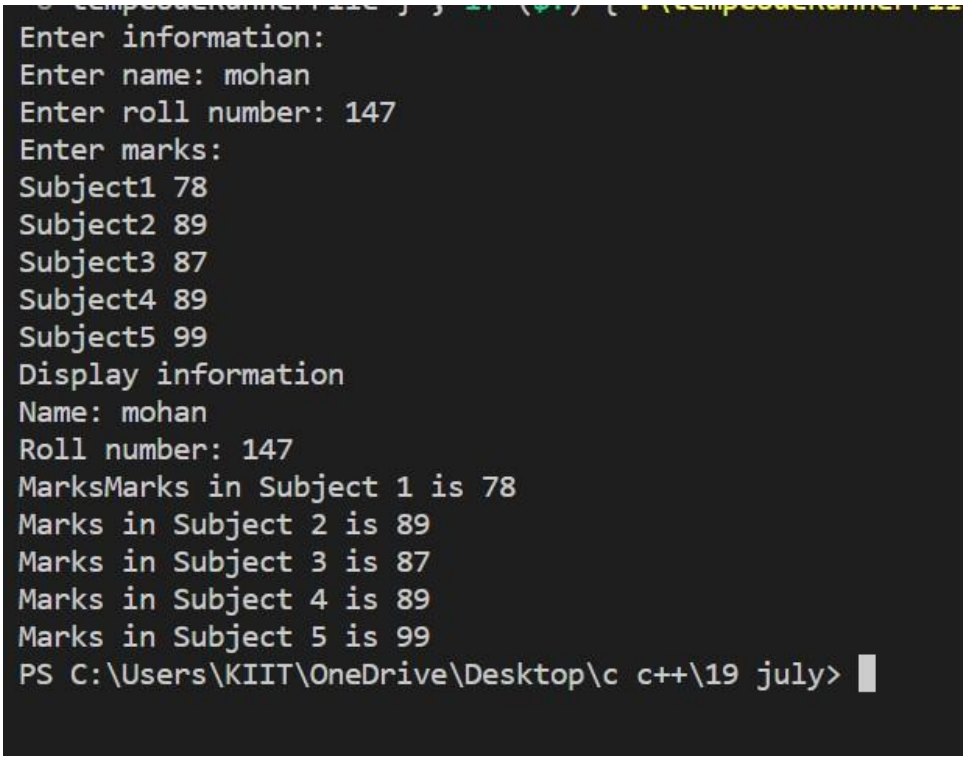
CODE IN C LANGUAGE

i)

```
#include <stdio.h>
struct student {
    char name[50];
    int roll;
    int marks[5];

} s;


int main() {
    printf("Enter information:\n");
    printf("Enter name: ");
    scanf("%s",s.name);


    printf("Enter roll number: ");
    scanf("%d", &s.roll);
    printf("Enter marks: \n");
    int i=0;
    for(i=0;i<5;i++)
    {
        printf("Subject%d ",i+1);
        scanf("%d",&s.marks[i]);
```

```
    }
    printf("Display information\n");
      printf("Name: %s\n",s.name);

     printf("Roll number: %d\n", s.roll);
    printf("Marks");
    for(i=0;i<5;i++)

    {
        printf("Marks in Subject %d is %d\n",i+1,s.marks[i]);
    }
  return 0;
}
```

Output



ii)

```
/*Question2

WAP to input name, roll number and marks in 5 subjects for n number of students. Write

functions to:-

a. Find total marks and percentage of all n students.

b. Display details of a student with a given roll number.

c. Display the details for all the students having percentage in a given range.

d. Sort the array in ascending order of marks   */



#include <stdio.h>

struct Student

{

    char name[30];

    int rollNumber;

    int marks[5];

    int totalMarks;

    float percentage;

};

// a.   Find  total  marks  and  percentage  of  all  n  students.

void findTotalMarksPercentageStudents(struct Student students[], int numberStudents)

{

    int i, m;

    for (i = 0; i < numberStudents; i++)

    {

        students[i].totalMarks = 0;

        students[i].percentage = 0.0;
```

```
        for (m = 0; m < 5; m++)
        {
            students[i].totalMarks += students[i].marks[m];
            students[i].percentage += students[i].marks[m] * 0.2;
        }
    }
}


// b.  Display  details  of  a  student  with  a  given  roll  number.
void displayDetailsStudent(struct Student students[], int numberStudents, int
rollNumber)
{
    int i, m;
    for (i = 0; i < numberStudents; i++)
    {
        if (rollNumber == students[i].rollNumber)
        {
            printf("The student's name: %s\n", students[i].name);
            printf("The student's roll number: %d\n", students[i].rollNumber);
            printf("The student's marks\n");
            for (m = 0; m < 5; m++)
            {
                printf("%d ", students[i].marks[m]);
            }
            printf("\nThe student's total marks: %d\n", students[i].totalMarks);
            printf("The student's percentage: %.2f\n", students[i].percentage);
            printf("\n");
            break;
        }
```

```
    }
}
// c.  Display the details for all the students having percentage in a given range.
void displayDetailsSudentsPercentageRange(struct Student students[], int numberStudents, float percentage1, float percentage2)
{
    int i, m;
    for (i = 0; i < numberStudents; i++)
    {
        if (students[i].percentage >= percentage1 && students[i].percentage <= percentage2)
        {
            printf("The student's name: %s\n", students[i].name);
            printf("The student's roll number: %d\n", students[i].rollNumber);
            printf("The student's marks\n");
            for (m = 0; m < 5; m++)
            {
                printf("%d ", students[i].marks[m]);
            }
            printf("\nThe student's total marks: %d\n", students[i].totalMarks);
            printf("The student's percentage: %.2f\n", students[i].percentage);
            printf("\n");
        }
    }
}
// d.  Sort the array in ascending order of marks.
void sortArrayInAscendingOrderMark(struct Student students[], int numberStudents)
{
    int i, j, m;
```

```
    for (i = 0; i < numberStudents - 1; i++)
    {
        for (j = 0; j < numberStudents - i - 1; j++)
        {
            if (students[j].totalMarks > students[j + 1].totalMarks)
            {
                // swap temp and elements[i]
                struct Student temp = students[j];
                students[j] = students[j + 1];
                students[j + 1] = temp;
            }
        }
    }


    for (i = 0; i < numberStudents; i++)
    {
        printf("The student's name: %s\n", students[i].name);
        printf("The student's roll number: %d\n", students[i].rollNumber);
        printf("The student's marks\n");
        for (m = 0; m < 5; m++)
        {
            printf("%d ", students[i].marks[m]);
        }
        printf("\nThe student's total marks: %d\n", students[i].totalMarks);
        printf("The student's percentage: %.2f\n", students[i].percentage);
        printf("\n");
    }
}
```

```
void main()
{
    struct Student students[100];
    int numberStudents, i, m;
    int rollNumber;
    float percentage1;
    float percentage2;
    printf("Enter the number of students: ");
    scanf("%d", &numberStudents);


    for (i = 0; i < numberStudents; i++)
    {
        fflush(stdin);
        printf("Enter the student's name: ");
        gets(students[i].name);
        printf("Enter the student's roll number: ");
        scanf("%d", &students[i].rollNumber);
        for (m = 0; m < 5; m++)
        {
            printf("Enter the student's mark %d: ", (m + 1));
            scanf("%d", &students[i].marks[m]);
        }
        printf("\n");
    }
    findTotalMarksPercentageStudents(students, numberStudents);
    printf("Enter the student's roll number to search: ");
    scanf("%d", &rollNumber);
```

```
    displayDetailsStudent(students, numberStudents, rollNumber);



    printf("Enter the student's percentage 1 to search: ");

    scanf("%f", &percentage1);

    printf("Enter the student's percentage 2 to search: ");

    scanf("%f", &percentage2);

    displayDetailsSudentsPercentageRange(students, numberStudents, percentage1,
percentage2);



    printf("\nSort  the  array  in  ascending order of marks.\n");

    sortArrayInAscendingOrderMark(students, numberStudents);

    printf("\n");

}
```

Output

```
Enter the number of students: 2
Enter the student's name: mohan
Enter the student's roll number: 146
Enter the student's mark 1: 89
Enter the student's mark 2: 99
Enter the student's mark 3: 100
Enter the student's mark 4: 78
Enter the student's mark 5: 88

Enter the student's name: mohan
Enter the student's roll number: 147
Enter the student's mark 1: 78
Enter the student's mark 2: 78
Enter the student's mark 3: 89
Enter the student's mark 4: 90
Enter the student's mark 5: 99

Enter the student's roll number to search: 146
The student's name: mohan
The student's roll number: 146
The student's marks
89 99 100 78 88
The student's total marks: 454
The student's percentage: 90.80

Enter the student's percentage 1 to search: 90
Enter the student's percentage 2 to search: 89

Sort  the  array  in  ascending order of marks.
The student's name: mohan
The student's roll number: 147
The student's marks
78 78 89 90 99
The student's total marks: 434
The student's percentage: 86.80

The student's name: mohan
The student's roll number: 146
The student's marks
89 99 100 78 88
The student's total marks: 454
The student's percentage: 90.80
```

iii)

```
#include <stdio.h>

struct employee

{

    char name[50];

    int id;

    int bs;



};

int main()

{
```

```
    int i=0,n=0,total=0,da=0,hra=0,per=0;
    printf("Enter the number of employees ");
    scanf("%d",&n);
    struct employee e[n];
    for(i=0;i<n;i++)
    {
        struct employee *ptr=&e[i];
        printf("enter the name id and basic salary of %d employee ",i+1);
        scanf("%s" ,ptr->name);
        scanf("%d",&ptr->id);
        scanf("%d",&ptr->bs);


    }
    for(i=0;i<n;i++)
    {
        da=e[i].bs*0.8;
        hra=e[i].bs*0.1;
        total=e[i].bs+da+hra;
        printf("Details of %d employee are \n ",i+1);
        printf("Name= %s\n Id= %d \ngross salary= %d\n
",e[i].name,e[i].id,total);
        da=0;
        hra=0;
        total=0;



    }
```

}

Output

```
) { .\q3 }
Enter the number of employees 2
enter the name id and basic salary of 1 employee mohan
1001
100000
enter the name id and basic salary of 2 employee sanidhya
1002
200000
Details of 1 employee are
 Name= mohan
 Id= 1001
gross salary= 190000
  Details of 2 employee are
 Name= sanidhya
 Id= 1002
gross salary= 380000
```

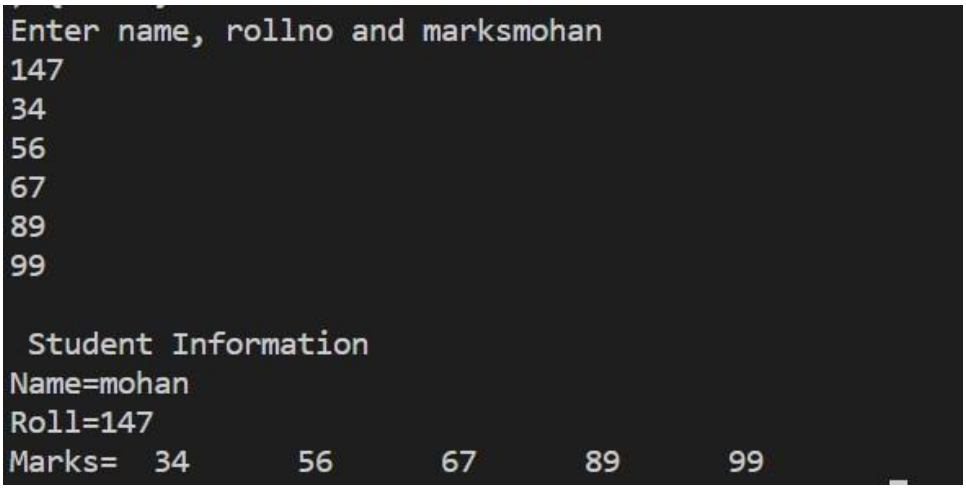
Program in c++

i)

```
//structure in c++
#include <iostream>
using namespace std;


struct student
{
  char name[30];
  int roll;
  int marks[5];
  void getdata()
```

```
  {
    cout<<"Enter name, rollno and marks";
    cin>>name;
    cin>>roll;
    //cin>>name>>roll;
    for(int i=0;i<5;i++)
      cin>>marks[i];
  }
  void dispdata()
  {
    cout<<"Name="<<name<<endl;
    cout<<"Roll="<<roll<<"\n";
    cout<<"Marks="<<"\t";
    for(int i=0;i<5;i++)
    cout<<marks[i]<<"\t";
  }
};
int main()
{
  student s;// struct is not required to declare a structure variable
  s.getdata();
  cout<<"\n Student Information\n";
  s.dispdata();
  return 0;
}
```

Output



ii)

```
#include<iostream>
#include<string>
using namespace std;

class student {
  string name;
  int roll;
  float marks[5];
  float totalMarks;
  float percentage;

 public:

  void setName(string name) {
      this -> name = name;
    }

    void setRoll(int roll) {
          this -> roll = roll;
    }
```

```
  void setMarks(float *marks) {
        for(int i = 0 ; i < 5 ; i++) {
          this -> marks[i] = marks[i];
        }
  }

  void setTotalMarks() {
    float total = 0;
    for(int i = 0 ; i < 5 ; i++) {
        total += this -> marks[i];
    }
    this -> totalMarks = total;
  }

void setPercentage() {
    float total = 0;
    for(int i = 0 ; i < 5 ; i++) {
        total += this -> marks[i];
    }
    this -> percentage = total/5;
}
string getName() {
  return this -> name;
}
int getRoll() {
  return this -> roll;
}
float getTotalMarks() {
  return this -> totalMarks;
```

```
    }

    float getPercentage() {
       return this -> percentage;
    }
    void printMarks() {
      for(int i = 0 ; i < 5 ; i++) {
        cout << this -> marks[i] << "\t";
      }
    }
    void studentWithGivenRollNumber(int roll) {
          if(this -> roll == roll) {
            cout << "DETAILS OF ROLL NUMBER " << roll << " ARE AS FOLLOWS : "
<< endl << endl;
            cout << "NAME : " << this -> name << endl;
            cout << "MARKS : ";
            for(int i = 0 ; i < 5 ; i++) {
                cout << this -> marks[i] << "\t";
            }
            cout << endl;
            cout <<"TOTAL MARKS : " << this -> totalMarks << endl;
            cout << "PERCENTAGE : " << this -> percentage << "%" << endl;
            cout << endl;
          }
    }

    void studentInGivenRange(float lowerRange , float upperRange) {
          if(this -> percentage >= lowerRange && this -> percentage <=
upperRange) {
            cout << "NAME : " << this -> name << endl;
```

```
            cout << "ROLL NUMBER : " << this -> roll << endl;
            cout << "MARKS : ";
            for(int i = 0 ; i < 5 ; i++) {
                cout << this -> marks[i] << "\t";
            }
            cout << endl;
            cout <<"TOTAL MARKS : " << this -> totalMarks << endl;
            cout <<"PERCENTAGE : " << this -> percentage << "%" << endl;
            cout << endl;
          }
  }

};
void sortStudentArray(student *s,int n) {
  for(int i = 0 ; i < n ; i++) {
    student min = s[i];
    int minIndex = i;

    for(int j = i+1 ; j < n ; j++) {
      if(s[j].getTotalMarks() < min.getTotalMarks()) {
        min = s[j];
        minIndex = j;
      }
    }

    student temp = s[i];
    s[i] = s[minIndex];
    s[minIndex] = temp;
  }
}
```

```
int main() {
  int n;
  cout << "ENTER TOTAL NO. OF STUDENTS : ";
  cin >> n;
  student s[n];

  for(int i = 0 ; i < n ; i++) {
   string name;
   cout << "ENTER NAME OF STUDENT " << i+1 << " : ";
   cin >> name;
   s[i].setName(name);

   int roll;
   cout << "ENTER ROLL NUMBER OF THE STUDENT : " ;
   cin >> roll;
   s[i].setRoll(roll);

   float arr[5];
   cout << "ENTER MARKS IN 5 SUBJECTS OF THE STUDENT : " << endl ;
   for(int i = 0 ; i < 5 ; i++) {
      cin >> arr[i];
   }
   s[i].setMarks(arr);
   s[i].setTotalMarks();
   s[i].setPercentage();
 }

 cout <<endl<<"(A)"<<endl;
```

```
   //finding total marks & percentage of all students
   for(int i = 0 ; i < n ; i++) {
     cout << "TOTAL MARKS OF STUDENT " << i+1 << " : " << s[i].getTotalMarks()
<< endl;
     cout << "PERCENTAGE OF STUDENT " << i+1 << " : " << s[i].getPercentage()
<<"%"<< endl;
     cout << endl;
   }

   cout << endl << "(B)" << endl;

   //display student information of a given roll number
   int num;
   cout << "ENTER THE DESIRED ROLL NUMBER : ";
   cin >> num;
   for(int i = 0 ; i < n ; i++) {
    s[i].studentWithGivenRollNumber(num);
   }
   cout << endl << "(C)" << endl;

   //display details for all the students having percentage in a given range
    float lowerLimit , upperLimit;
    cout << "ENTER LOWER RANGE & UPPER RANGE RESPECTIVELY : " << endl;
    cin >> lowerLimit >> upperLimit;
    cout << endl << "STUDENTS HAVING PERCENTAGE IN THE RANGE OF " <<
lowerLimit << "% - " << upperLimit <<"% : "<<endl << endl;
    for(int i = 0 ; i < n ; i++) {
    s[i].studentInGivenRange(lowerLimit,upperLimit);
   }

   // sorting the student array in ascending order of marks
```

```
  sortStudentArray(s,n);

  cout << endl << "(D)" << endl;

  cout <<"AFTER SORTING THE UPDATED ORDER OF STUDENT IS : " << endl << endl;

  for(int i = 0 ; i < n ; i++) {
    cout << "NAME : " << s[i].getName() << endl;
    cout << "ROLL NUMBER : " << s[i].getRoll() << endl;
     cout << "MARKS : ";
    s[i].printMarks();
    cout << endl;
    cout <<"TOTAL MARKS : " << s[i].getTotalMarks() << endl;
    cout <<"PERCENTAGE : " << s[i].getPercentage() << "%" << endl;
    cout << endl;
  }

}
```

Output

```
ENTER TOTAL NO. OF STUDENTS : 2
ENTER NAME OF STUDENT 1 : mohan
ENTER ROLL NUMBER OF THE STUDENT : 14
ENTER MARKS IN 5 SUBJECTS OF THE STUDENT :
34
45
56
67
78
ENTER NAME OF STUDENT 2 : ari
ENTER ROLL NUMBER OF THE STUDENT : 15
ENTER MARKS IN 5 SUBJECTS OF THE STUDENT :
5
67
78
89
90

(A)
TOTAL MARKS OF STUDENT 1 : 280
PERCENTAGE OF STUDENT 1 : 56%

TOTAL MARKS OF STUDENT 2 : 329
PERCENTAGE OF STUDENT 2 : 65.8%


(B)
ENTER THE DESIRED ROLL NUMBER : 15
DETAILS OF ROLL NUMBER 15 ARE AS FOLLOWS :

NAME : ari
MARKS : 5       67      78      89      90
TOTAL MARKS : 329
PERCENTAGE : 65.8%
```

```
(C)
ENTER LOWER RANGE & UPPER RANGE RESPECTIVELY :
10
100

STUDENTS HAVING PERCENTAGE IN THE RANGE OF 10% - 100% :

NAME : mohan
ROLL NUMBER : 14
MARKS : 34      45      56      67      78
TOTAL MARKS : 280
PERCENTAGE : 56%

NAME : ari
ROLL NUMBER : 15
MARKS : 5       67      78      89      90
TOTAL MARKS : 329
PERCENTAGE : 65.8%


(D)
AFTER SORTING THE UPDATED ORDER OF STUDENT IS :

NAME : mohan
ROLL NUMBER : 14
MARKS : 34      45      56      67      78
TOTAL MARKS : 280
PERCENTAGE : 56%

NAME : ari
ROLL NUMBER : 15
MARKS : 5       67      78      89      90
TOTAL MARKS : 329
PERCENTAGE : 65.8%
```

iii)

```
#include <iostream>

using namespace std;

struct employee

{

    int id;

    char name[50];

    int bs;

    void getdata()

    {

        cout<<"Enter ID,name,basic salary";

        cin>>id;
```

```
        cin>>name;
        cin>>bs;


    }
    void calculate()
    {
        int da=0.8*bs;
        int hra=0.1*bs;
        int gross=bs+da+hra;
        cout<<"DA= "<<da<<"\n";
        cout<<"HRA= "<<hra<<"\n";
        cout<<"gross="<<gross<<"\n";


    }


};
int main()
{
    cout<<"enter no of employees ";
    int n;
    cin>>n;
    employee e[n];
    for(int i=0;i<n;i++)
    {
        e[i].getdata();
    }
    for(int i=0;i<n;i++)
```

```
    {
        cout<<"details"<<"\n";
        cout<<"name= "<<e[i].name<<"\n";
        cout<<"id= "<<e[i].id<<"\n";
        e[i].calculate();
    }
    return 0;


}
```

Output

```
enter no of employees 2
Enter ID,name,basic salary1001
sanidhya
10000
Enter ID,name,basic salary1002
mohan
20000
details
name= sanidhya
id= 1001
DA= 8000
HRA= 1000
gross=19000
details
name= mohan
id= 1002
DA= 16000
HRA= 2000
gross=38000
```